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## OBSERVATIONS ON THE HABITS OF CERTAIN LARVÆ.

By George F. Gaumer, Student in the University of Kansas.

During the past summer I have been considerably interested in the peculiar habits of several larvae which I have undertaken to breed.

About the first of July I found some larvae feeding upon the leaves of the Canadian Moonseed (*Menispermum Canadense*). These larvae were then about one inch in length. The general color was glossy-black, thickly dotted all over with white. They had concealed themselves by cutting off the leaf-stems and fastening the stems and leaves all together with a silken web. Some of these leaves were green; others, and by far the larger proportion, were dead. I noticed that none of the green leaves were eaten, while the dead ones were ragged from having been eaten.

On the evening of the tenth of July, while collecting moths just after dark in a woody pasture, I chanced to pass through a thicket of Moonseed vines, where I heard a noise as of rain falling on dry leaves. I soon found that the sound was caused by the larvae biting the dead leaves.

Upon a closer examination I found that they were then feeding upon the dried leaves which they had previously prepared. The snapping sound thus made could be distinctly heard at some distance.

During the day the caterpillars reposed in a long tube composed of silk and dried leaves in the middle of the bunch.

Some of these larvae were placed in a glass jar covered with mosquito bar. While there they grew slowly and cut the dried leaves into small pieces and devoured most of them; green leaves were introduced into the jar but remained untouched while green; when dry they were treated as the others.

It was now about the first of September and there was no change, so that I began to despair of obtaining any imagos from them, and did not look at them again until the first week of October, when they had all disappeared except two.

These two had spun a kind of coarse cocoon in the tube mentioned above, and were in this still unchanged. The body was somewhat shorter and thicker than when first taken.

Early in July I obtained from the tomato a very large larva of *Sphinx 5-maculata*, and placed it in the breeding cage for safe keeping until I should have time to write a description of it. When I came for the larva next morning, it had disappeared. I soon discovered where it went into the ground. I then began to remove the earth very carefully until I came upon what I supposed to be its cell; then digging down upon one side I next removed the upper part of the arch with a sharp knife.

The cell was then very little larger than the insect's body. The caterpillar was busily engaged working around the sides of its cell with its head. Every few moments it would contract the length of its body and in this way force out the soft earth. It then closed the opening which I had made in the cell. A few minutes later I again opened the cell and found it considerably enlarged, and the caterpillar carefully working around the sides with its jaws, and at the same time secreting a greenish fluid with which it was moistening the inner surface of its cell. The whole internal surface was now moist and smooth. It again closed the opening and I then left it for several days, when I again opened it and found the cell to be about three

inches in length by one and a half inches in height. The larva had already cast its skin. A few days later the chrysalis made its way through the wall of its cell, which had become very hard, almost like sun-dried brick, leaving a rather small circular opening in the end, and then working its way up through nine inches of soil before it reached the surface.

During the first three weeks of July, a creamy white caterpillar, with a very conspicuous dark green dorsal line, made its appearance upon the willow bushes along the banks of the Wakarusa. It was one and fifteen-sixteenths inches in length, and when alarmed or at rest was coiled up and hung to the edge of a leaf.

Some of these caterpillars were removed to the breeding cage where they grew rapidly, and soon afterward descended and excavated a small pit in which they made a very thick, strong, brown cocoon, nearly as tough as leather; it was very smooth inside, impervious to water and not easily indented. Some weeks later a cocoon was opened and the larva was still unchanged. In this condition the larva still remains, and will most probably so hibernate.

On the second of October I found a large *Sphinx* larva which was feeding upon the green ash. It was not very active, and ate but little for several days. Thinking that it might soon transform, I took it from the cage and began to describe it. While in the act of measuring it a small white worm forced its way through the skin and stood upright upon the back of the caterpillar; soon, more began to come out, and in twenty minutes there were forty-two of these little parasitic grubs standing up at right angles to the body of the sphinx. In a few minutes these little worms began to double up so that head and tail came together. They then spun a fine, white, silk cocoon, and wove it about as wide as their own diameter; this they completed in two days. The *Sphinx* larva was alive and able to walk all this time, but did not eat. It died four days later.

Before the second brood of Maple Worms (*Anisota rubicunda*) had attained their growth, the supply of maple leaves was entirely exhausted, so that the worms were compelled to set out in search of food. At one place on the Wakarusa there is a grove of maples, some of which are very large; near this grove there is an open field which had been freshly ploughed, and was slightly beaten down by the late summer rains.

While crossing this field one morning my attention was called to some maple worms crawling upon the ground at least fifteen rods from the nearest maple tree. After looking about for a few moments I found several specimens five rods or more beyond the first, making the remarkable distance of over twenty rods from the grove. Immense numbers of these larvae must have perished on the Wakarusa and Coal creek bottoms from want of food. After the maple leaves were all gone I frequently found them feeding upon the leaves of the burr-oak.

A few days later, while at the old University building, I was surprised to find hundreds of these larvae ascending Mount Oread from the maple groves in the corners of the lot, a distance of about eighteen rods from the old University. Nor did they stop when they had reached the summit of the hill, but many of them were trying to ascend the building. Curious to know what success they were having, I went to the top and there found three way-worn and sickly-looking worms; one of these was much contracted in length and soon afterward transformed into a chrysalis. These larvae had attained a height of more than one hundred and fifty feet above the place from which they started.